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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte ROBERT LEE CLINE, PETER H. MARKUSCH, and RALF GUETHER

Appeal 2008-4166
Application 10/675,536
Technology Center 1700

Decided: November 6, 2008

Before DONALD E. ADAMS, DEMETRA J. MILLS, and RICHARD M. LEBOVITZ, *Administrative Patent Judges*.

LEBOVITZ, *Administrative Patent Judge*.

DECISION ON APPEAL

This is a decision on appeal from the final rejection of claims 1-5, 7-11, 13-17, 19-23, 25-29, and 31-35. Jurisdiction is under 35 U.S.C. § 6(b). We affirm.

STATEMENT OF THE CASE

The claims are directed to processes for producing polyurethane(urea) encapsulated slow release fertilizer particles. Claims 1-5, 7-11, 13-17, 19-

23, 25-29, and 31-35 are pending and stand rejected by the Examiner under 35 U.S.C. § 103(a) as obvious over Wynnyk (US 2004/0016276 A1, Jan. 29, 2004) and Moore (US 4,804,403, Feb. 14, 1989) (Ans. 3).

Claim 1, which is representative of the claimed subject matter, reads as follows:

> 1. A process for producing polyurethane(urea) encapsulated, slow release fertilizer particles comprising:
>
> a) applying a polyisocyanate component to fertilizer particles to form isocyanate coated fertilizer particles,
>
> b) mixing an inert filler with said isocyanate coated fertilizer, wherein said inert, inorganic filler is insoluble or substantially insoluble in water and contains at least 50% by weight of particles having a particle size of less than 100 microns,
>
> c) adding an isocyanate-reactive component to the mixture of step b), wherein said isocyanate-reactive component is selected from the group consisting of polyether polyols having an equivalent weight of less than 200 and a functionality of 2 to 8 and compounds having a molecular weight of from 105 to 400 and an equivalent weight of from about 31 to less than about 100 and containing from 2 to 4 hydroxyl groups, and
>
> d) allowing the reactive components to form filler containing polyurethane(urea) encapsulated fertilizer particles containing from about 1 to about 15 percent by weight of filled polyurethane(urea), said percent by weight based on the total weight of the encapsulated fertilizer, with the proviso that the weight ratio of polyurethane(urea) to filler is from about 80:20 to about 30:70.

ISSUE

The subject matter is this appeal is drawn to processes for producing polyurethane(urea) encapsulated, slow release fertilizer particles. Claim 1 involves applying a polyisocyanate to a fertilizer, mixing in an inert filler, adding a polyether polyol which reacts with the polyisocyanate, and allowing the components to react to form polyurethane(urea) encapsulated

fertilizer. Independent claims 7, 13, 19, 25, and 21 claim the same components, but differ from claim 1 in the order of steps in which the components are reacted or mixed. The cited prior art, Wynnyk and Moore, teach producing polyurethane coated fertilizer using the same components which are claimed, i.e., polyisocyanate, polyol, and filler, but differ in the order in which the components are mixed or reacted. Appellants contend that the prior art references do not disclose or suggest applying the claimed components in the order recited in the claims.

The issue to be resolved is this appeal is as follows:

Does the combination of Wynnyk and Moore suggest applying polyisocyanate, filler, and polyether polyol to fertilizer particles in the manner recited in claim 1?

FINDINGS OF FACT (FF)

Scope and content of the prior art

The Wynnyk patent

1. Wynnyk describes a controlled release fertilizer material comprising a plant nutrient which is surrounded by a "protective coating comprising at least one substantially homogenous layer of a urethane-containing compound and a filler(s)" (Wynnyk, Abstract).

2. "[T]he term 'urethane-containing compound' is intended to mean a product obtained by reacting a polyol(s) and an isocyanate(s). Typically, the so-produced compound will be a polyurethane" (Wynnyk, at ¶ 31).

3. Wynnyk states that the "term 'homogeneous' is used in a somewhat broad sense for the purpose of excluding a controlled release fertilizer material comprising only distinct layers of urethane and wax" (Wynnyk, at

¶ 30).

4. The coating is produced with particulate filler that is mixed with a polyol and reacted with an isocyanate (Wynnyk, at ¶ 20).

5. According to Wynnyk, the "choice of polyol is not particularly restricted and is within the purview of a person skilled in the art . . . For example, the polyol may be a hydroxyl-terminated backbone of a member selected from the group comprising polyether . . . The most preferred such polyol is a polyether polyol" (Wynnyk, at ¶ 47).

6. The "manner by which the particulate filler material is added to the protective coating is not restricted. Thus, for example, it is possible to add the particulate filler to the isocyanate or to a mixture of the polyols and isocyanates or in conjunction with other non-reactive materials" (Wynnyk, at ¶ 20).

7. Wynnyk describes a step (a) in which "particulate plant nutrient" is contacted "with a mixture comprising: a polyol, an isocyanate, an organic additive and filler to produce a coating surrounding the particulate plant nutrient" (Wynnyk, at ¶ 66).

8. However, Wynnyk states that the "precise mode of applying the mixture to the plant nutrient is not particularly restricted" (Wynnyk, at ¶ 66) and states that each of the polyol, isocyanate, and filler and can be applied in "streams" which are independent of each of other (*id.* at ¶ 71).

9. "[M]ixtures of some or all components in the coating can be combined and applied in one or more streams. The mixing of coating components and order of introducing these streams into the system can be in any possible combination" (Wynnyk, at ¶ 71).

10. According to Wynnyk, the step (a) can be accomplished with separate streams, including a separate stream which contains only particular filler:

> Step (a) comprises contacting the particulate plant nutrient with a first stream comprising the polyol component (with/without organic additive and/or filler) and a second stream comprising the isocyanate (with/without organic additive and/or filler), the first stream and the second stream being independent of one another. In this embodiment, the particulate plant nutrient may be contacted simultaneously with the first stream and the second stream. Alternatively, the particulate plant nutrient may be contacted with the second stream followed by the first stream. A third stream may also be used, for example, the particulate filler or the mixture of the filler and the organic additive.

(Wynnyk, at ¶ 72.)

The Moore patent

11. Moore teaches fertilizer particles which are coated with polyfunctional isocyanate to form a base coating (Moore, at col. 3, ll. 24-32).

12. The base coating can then be reacted with a polyol to provide a water-insoluble coating (Moore, at col. 3, ll. 32-41 and 64-67; *see* also at col. 2, l. 65 to col. 3, l. 10-15; col. 7, ll. 32-39). The polyol can be a polyester polyol (*id.* at 7, l. 39).

13. Moore states that fillers can be added between the base coating formed by isocyanate and the water-insoluble coating formed by the polyol (Moore, at col. 8, ll. 23-35).

Differences between the prior art and the claimed invention

14. Claim 1 is drawn to a process for producing a polyurethane encapsulated fertilizer with the following four steps:

a) applying polyisocyanate to fertilizer particles to form coated particles;

b) mixing coated particles with an inert filler;

c) adding a polyether polyol ("an isocyanate-reactive component") to the mixture of step b); and

d) allowing the components to react to form filler containing polyurethane(urea) encapsulated fertilizer particles.

15. Independent claims 7, 13, 19, 25, and 31 recite the same steps as in claim 1, but in different orders or permutations of making a polyurethane coated fertilizer particle.

17. Wynnyk's process comprises reacting a polyisocyanate and polyol, the same reactants recited in steps a) and c) of claim 1 (FF2, 4, 7-10).

18. Wynnyk also teaches the addition of filler – as in step b) of claim 1 (FF2).

19. Moore describes a process of producing coated fertilizer particles that includes the steps of coating fertilizer with a isocyanate (FF11), reacting with a polyol (FF12-13), and adding filler (FF13), meeting the limitations of steps a), b), c), and d) of claim 1.

20. Neither Wynnyk nor Moore teaches all recited permutations of applying a polyisocyanate, polyol, and filler as in the claims.

PRINCIPLES OF LAW

"During [patent] examination, the examiner bears the initial burden of establishing a prima facie case of obviousness." *In re Kumar*, 418 F.3d 1361, 1366 (Fed. Cir. 2005).

It is well settled that, "in a section 103 inquiry, 'the fact that a specific [embodiment] is taught to be preferred is not controlling, since all disclosures of the prior art, including unpreferred embodiments, must be considered.'" *Merck & Co. v. Biocraft Laboratories Inc.*, 874 F.2d 804, 807 (Fed. Cir. 1989) (quoting *In re Lamberti*, 545 F.2d 747, 750 (CCPA 1976). Thus, "[a]ll the disclosures in a reference must be evaluated, including nonpreferred embodiments." *In re Mills*, 470 F.2d 649, 651 (CCPA 1972) (citations omitted).

ANALYSIS

"During [patent] examination, the examiner bears the initial burden of establishing a prima facie case of obviousness." *In re Kumar*, 418 F.3d 1361, 1366 (Fed. Cir. 2005). In this case, the Examiner finds that each of Wynnyk and Moore teach the same steps as in claim 1 and others of applying isocyanate, polyol, and filler to fertilizer particles, but not the specific order of steps recited in the claims (Ans. 6; FF14-20). However, the Examiner concludes that:

> even though the patents do not teach the various permutations and combinations of applying the filler to a polyurethane coated fertilizer granulate, in well enunciated steps to recite method claims of the type herein, it would have been obvious to one of ordinary skill in the art, based on the prior art of record, that in following the references, every embodiment instantly claimed was already known in the art at the time the invention was made or clearly suggested by the above 2 references. Also based on such prior art, to make further modifications to optimize the various alternatives would have been obvious because the normal desire of scientists or artisans to improve upon what is already known.

(Ans. 6.)

We agree with the Examiner that the subject matter of claim 1 would have been prima facie obviousness to persons of ordinary skill in the art. As established by the Examiner, each of Wynnyk and Moore describe making a polyurethane coated fertilizer particle using polyisocyanate, polyol, and filler – as in steps (a) through (d) of claim 1. Moore particularly teaches mixing a filler with particles that have been coated with a polyisocyanate, and then further reacting with a polyol (FF19). Moore, as does Wynnyk, also teaches that the polyol can be a polyester polyol (FF5, 12) – the same polyol which is recited in claim 1. Finally, Wynnyk states that mixing and coating of the components can be accomplished "in any possible combination" and "is not particularly restricted" (*see* FF8-10) and says the same for addition of the filler (FF6). Thus, the prior art explicitly teaches that the order of applying the various components can be varied as they have been in the claimed subject matter.

Appellants argue that Wynnyk teaches a "protective controlled release coating" which "incorporates urethane, filler and organic additive into one substantially homogenous layer" (App. Br. 7). Appellants state Wynnyk "clearly discloses that separate layers are not formed by the process therein" (*id.*).

This argument does not persuade us that the Examiner erred. Appellants have not pointed to any limitation in claim 1 that requires the polyurethane encapsulated particle to be formed of separate layers. Therefore, Appellants appear to be distinguishing claim 1 from the prior art over limitations that are not recited in the claim. In addition to this, Wynnyk expressly states that it uses the term "homogeneous" in a "somewhat broad sense" to distinguish from layers of wax and urethane (FF3). Thus, Wynnyk

does not expressly exclude the urethane, itself, from having a layered structure. Finally, Wynnyk characterizes its urethane as a product "obtained by reacting a polyol(s) and an isocyanate(s)" (Wynnyk, at ¶ 31; FF2). The process of producing a urethane of claim 1 also involves reacting an isocyanate and polyol (FF14). Thus, it is not evident that there is any difference in the reaction between the components which are claimed and those disclosed in Wynnyk. Accordingly, it would have reasonable for persons of ordinary skill in the art to believe that the polyurethane structure of Wynnyk is the same as that which is claimed. Appellants have not provided any evidence to the contrary – or that the claimed steps result in a product which differs from that described by Wynnyk or Moore.

Appellants also contend that it would not have been obvious to combine Wynnyk with Moore because Moore "forms different or separate layers of components" which is "clearly the opposite of what" Wynnyk desires to achieve (App. Br. 8). This argument is not persuasive. Each of Wynnyk and Moore use the same components, i.e., isocyanate, polyol, and filler, to achieve a coated fertilizer particle. Each of the references teaches that the components can be added to the fertilizer in different streams and in different orders. For example, Wynnyk explicitly refers to adding in the components in separate and independent streams (FF8-10). Moore also expressly describes separately adding isocyanate, filler, and polyol to particles (FF11-13). Thus, we are not persuaded that Wynnyk's process is "opposite" to Moore's or that the combination is improper – as argued by Appellants.

Appellants state that all the examples described in Wynnyk "add the particulate filler to the polyol component and this mixture is applied

simultaneously with the isocyanate component to the particular plant nutrient" (App. Br. 9). Appellants contend that when the filler and polyol are mixed, a thick paste results which cannot be applied to the fertilizer (*id.*; Reply Br. 2).

This argument is not persuasive. Wynnyk expressly and clearly states that the polyol, isocyanate, and filler can be applied in separate and sequential streams:

> Step (a) comprises contacting the particulate plant nutrient with a first stream comprising the polyol component (with/without organic additive and/or filler) and a second stream comprising the isocyanate (with/without organic additive and/or filler), the first stream and the second stream being independent of one another. In this embodiment, the particulate plant nutrient may be contacted simultaneously with the first stream and the second stream. Alternatively, the particulate plant nutrient may be contacted with the second stream followed by the first stream. A third stream may also be used, for example, the particulate filler or the mixture of the filler and the organic additive.

(Wynnyk, at ¶ 72; *see* FF10.) Appellants have not addressed this explicit disclosure, but instead focus on other parts of the reference which teach embodiments in which all components are added at the same time. It is well settled that, "in a section 103 inquiry, 'the fact that a specific [embodiment] is taught to be preferred is not controlling, since all disclosures of the prior art, including unpreferred embodiments, must be considered."' *Merck & Co. v. Biocraft Laboratories Inc.*, 874 F.2d 804, 807 (Fed. Cir. 1989) (quoting *In re Lamberti*, 545 F.2d 747, 750 (CCPA 1976). Thus, "[a]ll the disclosures in a reference must be evaluated, including nonpreferred embodiments." *In re Mills*, 470 F.2d 649, 651 (CCPA 1972) (citations omitted).

In addition to Wynnyk's disclosure that the isocyanate, polyol, and filler components can be added in separate streams – one followed by another – Moore also teaches a process in which the components can be added in different steps as claimed (FF12-13). Thus, Moore's teachings are consistent with Wynnyk's.

For the foregoing reasons, we affirm the rejection of claim 1.

CONCLUSION OF LAW

The combination of Wynnyk and Moore suggests applying polyisocyanate, filler, and polyether polyol to fertilizer particles in the manner recited in claim 1. Claims 2-5, 7-11, 13-17, 19-23, 25-29, and 31-35 fall with claim 1 because separate reasons for their patentability have not been provided. *See* 37 C.F.R. § 41.37(c)(1)(vii). Accordingly, the decision of the Examiner as to all the appealed claims is affirmed.

TIME PERIOD

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a).

AFFIRMED

Ssc:

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